

No experiments...

**Ex Marking
(Examples)**

International (IEC)	US (NEC 505)	US (NEC 500)	EC (CENELEC)	Directive 94/9/EC (ATEX 100a) required July 1, 2003
Ex ia IIC T6	Class I, Zone 0, AEx ia IIC T6	I.S., Class I, Division 1 Groups A, B, C, D, T6	EEx ia IIC T6	 II2G
Ex.....● Explosion protected ia.....● Type of protection II.....● Group C.....● Gas Group T6.....● Temperature Class	Class I● Permitted Class Zone 0● Permitted Zone A● American National Standard Ex.....● Explosion protected ia.....● Type of protection II.....● Group C.....● Gas Group T6.....● Temperature Class	I.S.● Type of protection Class I● Permitted Class Division 1● Permitted Division Groups A-D ● Permitted Gas Group T6● Temperature Class	E.....● European Standard Ex.....● Explosion protected ia.....● Type of protection II.....● Group C.....● Gas Group T6.....● Temperature Class	Equipment Groups I Mines II other than mines Categories 1 for Zone 0, 20 2 for Zone 1, 21 3 for Zone 2, 22 M1, M2 for Mines Materials G for gases, vapours and mist D for dusts

Area Classification for gases and vapours

Zone 2 (Zone 22 - dusts)	Zone 2	Division 2	gases and vapours	(dusts, fibers or flyings)	Zone 2 (Zone 22 - dusts)	flammable material present abnormally
Zone 1 (Zone 21 - dusts)	Zone 1	Division 1	gases and vapours		Zone 1 (Zone 21 - dusts)	present intermittently
Zone 0 (Zone 20 - dusts)	Zone 0				Zone 0 (Zone 20 - dusts)	present continuously

Protection Concepts

Type of Protection	Code	Permitted Use	Code	Permitted Use	Code	Permitted Use	Code	Permitted Use	Standards	Protection Principle
Increased Safety	Ex e	Zone 1, 2	AEx e	Class I, Zone 1, 2					IEC 60079-7 FM 3619, UL 2279-7	
Non-sparking Non-incendive Flameproof	Ex nA	Zone 2	AEx nA	Class I, Zone 2	NI	Class I, Div 2	EEx e	Zone 1, 2	EN 50019 IEC 60079-15, EN 50021, UL 2279-15	No arcs, sparks or hot surfaces
Explosionproof Powder Filled	Ex d	Zone 1, 2	AEx d	Class I, Zone 1, 2			EEx d	Zone 1, 2	IEC 60079-1 FM 3618, UL 2279-1	
Protected Contacts Intrinsic Safety	Ex q	Zone 1, 2	AEx q	Class I, Zone 1, 2	XP	Class I, Div 1, 2	EEx q	Zone 1, 2	EN 50018 FM 3615, ANSI/UL 1203	Contain the explosion and quench the flame
Limited Energy Pressurized	Ex nC	Zone 2	AEx nC	Class I, Zone 2			EEx nC	Zone 2	IEC 60079-5 FM 3622, UL 2279	
Encapsulation	Ex ia	Zone 0, 1, 2	AEx ia	Class I, Zone 0, 1, 2			EEx ia	Zone 0, 1, 2	EN 50017 IEC 60079-11	
Oil Immersion	Ex ib	Zone 1, 2	AEx ib	Class I, Zone 1, 2	IS	Class I, Div 1, 2	EEx ib	Zone 1, 2	IEC 60079-11 FM 3610, UL 2279-11	Limit energy of sparks and surface temperature
Restricted Breathing	Ex nR	Zone 2	AEx nR	Class I, Zone 2			EEx nR	Zone 2	FM 3610, UL 2279-11 EN 50020/50 039	
									EN 50020/50 039 IEC 60079-15, EN 50021, UL 2279-15	

Apparatus Grouping

Typical Gas, Dust, Fiber					Main European Certification and Testing Authorities		
Authority	Country	Marks Used					
PTB, DMT	Germany						
BASEEFA, SCS	United Kingdom						
KEMA	The Netherlands						
INERIS, LCIE	France						
CESI	Italy						
LOM	Spain						
Main North American Authorities							
Factory Mutual	USA						
Research Comp.	USA						
Underwriters	USA						
Laboratories							
CSA	Canada						

*Not within scope of NEC. Under jurisdiction of MSHA.

Temperature Class

Maximum Surface Temperature					International Protection (IP) Codes (EN 60529: 1992)	
First Numeral	Second Numeral	Protection against solid bodies	Protection against liquid			
0	0	No Protection	No Protection			
1		Objects greater than 50 mm	1 Vertical Dripping Water			
2		Objects greater than 12.5 mm	2 75° to 90° Angled Dripping Water			
3		Objects greater than 2.5 mm	3 Sprayed Water			
4		Objects greater than 1.0 mm	4 Splashed Water			
5		Dust-Protected	5 Water Jets			
6		Dust-Tight	6 Heavy Seas			
7			7 Effects of Immersion			
8			8 Indefinite Immersion			
			Example: IP65 – equipment is dust-tight and protected against water jets			
			Enclosure types acc. to ANSI/NEMA 250 (Extract)			
			Protection against personnel contact and comparison to IP-Codes			
		Type 1 falling dirt				
		Type 2 falling dirt, rain, snow				
		Type 3 falling dirt, rain, snow, splashing and hose-directed water				
		Type 4X as Type 4, in addition corrosion				
		Type 5 dust-protected				
		Type 6 dust-tight				
		Type 7 falling dirt, rain, snow, splashing and hose-directed water during occasional temporary submersion at a limited depth				
		Type 8 for hazardous locations Cl.I, Grp.A-D (indoor)				
		Type 9 for hazardous locations Cl.II, Grp.E-G (outdoor)				

...by selection of the correct components



NORGREN

Incorporating **HERION**

 CE MARKING

The CE mark shows that a product complies with the requirements of all European Union Directives relevant to that product.

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